

## ABSTRACT

A high velocity pressure burner system burns air and gas thereby creating a flue gas. The system comprises a blower for pressurizing the air; a control for adjusting the pressure of the pressurized air; a combustion chamber having a flue gas outlet; and a burner disposed on the combustion chamber. The burner includes an air orifice for receiving the pressurized air; a gas orifice for receiving the gas; the air orifice causing the pressured air to flow over the gas orifice to form an air/gas mixture; at least one spinner vane disposed upstream of the gas orifice creating turbulence in the air/gas mixture; and a retender disposed downstream of the gas orifice creating turbulence in the air/gas mixture. The flue gas outlet is sized to create a back pressure on the burning air/gas mixture. The flue gas from the combustion of the air/gas mixture in the combustion chamber increases in velocity as the flue gas passes through the flue gas exit. The high velocity pressure burner system is disposed on a vessel for heating the vessel such as a boiler. The boiler includes an exhaust stack sized to maintain a back pressure on the flue gas passing through the boiler. To eliminate the CO and reduce the NOX to less than 10 PPM, the burner is operated at a lower temperature of 2200° F. The vessel is then heated by forced convection heat transfer maintaining the velocity of the flue gas through the vessel at a velocity which is compatible with the insulation lining the vessel.